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$\equiv 0 \pmod{5^2}$. Hence $z \pm 7s \equiv 0 \pmod{5^2}$, so that $z = 25t + 7s$. Now $y = 5r \pm 2z = 25s \pm 7z = \pm 175t - 24s$. The only solutions prime to 5 are thus

$$y = \pm 175t - 24s, \quad z = 25t \mp 7s.$$

Conversely, these values satisfy the given congruence.

✎ Problems and solutions for this department should be sent to Dr. Wahlin, Urbana, Ill.

PROBLEMS FOR SOLUTION.

ALGEBRA.

351. Proposed by E. B. ESCOTT, University of Michigan, Ann Arbor, Mich.

$$\begin{aligned} \text{Solve, } y^2 + yz + z^2 &= a^2 \dots (1). \\ z^2 + zx + x^2 &= b^2 \dots (2). \\ x^2 + xy + y^2 &= c^2 \dots (3). \end{aligned}$$

352. Proposed by E. B. ESCOTT, University of Michigan, Ann Arbor, Mich.

$$\begin{aligned} \text{Solve the equations, } x^3 &= -8y + 24 \dots (1). \\ y^3 &= -8x + 24 \dots (2). \end{aligned}$$

GEOMETRY.

381. Proposed by J. SCHEFFER, A. M., Hagerstown, Md.

Find the number of diagonals of a *complete* polygon of n sides.

382. Proposed by PROF. R. C. ARCHIBALD, Brown University, Providence, R. I.

Between the side of a given rhombus and its adjacent side produced, to insert a straight line of a given length and directed to the opposite corner. "Euclidean constructions" are particularly desired.

383. Proposed by S. A. COREY, Hitsman, Iowa.

Let $ABCDE$ be a pentagon, plane, or gauche, with sides AB , BC , CD , and DE , of lengths, w , x , y , and z , respectively. Construct four other pentagons, $AB_1C_1D_1E_1$, $AB_{11}C_{11}D_{11}E_{11}$, $AB_{111}C_{111}D_{111}E_{111}$, and $AB_{iv}C_{iv}D_{iv}E_{iv}$, having a common vertex at A , and with four consecutive sides in each parallel to the corresponding consecutive sides, AB , BC , CD , and DE , in $ABCDE$. Further, let the lengths of the sides AB_1 , B_1C_1 , C_1D_1 , D_1E_1 , AB_{11} , $B_{11}C_{11}$, $C_{11}D_{11}$, $D_{11}E_{11}$, AB_{111} , $B_{111}C_{111}$, $C_{111}D_{111}$, $D_{111}E_{111}$, AB_{iv} , $B_{iv}C_{iv}$, $C_{iv}D_{iv}$, $D_{iv}E_{iv}$, be $-wW$, xX , yY , zZ , wX , xW , yZ , $-zY$, wY , yW , zX , $-xZ$, wZ , zW , xY , and $-yX$, respectively; the minus sign indicating the reversal of direction of the corresponding side. Prove that $(W^2 + X^2 + Y^2 + Z^2)(w^2 + x^2 + y^2 + z^2) = E_1A_1^2 + E_{11}A_{11}^2 + E_{111}A_{111}^2 + E_{iv}A_{iv}^2$.